KOKAI PATENT APPLICATION NO. SHO 63-307670

LAMINATED FUEL CELL

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LAMINATED FUEL CELL

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[*There are no amendments to this patent.*]

Specification

1. Title of the invention

Laminated fuel cell

2. Claim of the invention

1) A laminated fuel cell where many layers of cells having an electrolyte sandwiched between a cathode and an anode is formed, and an oxidized gas is supplied to the cathode side and a fuel gas is supplied to the anode side, and the cells are laminated via a separator, and the laminated fuel cell is characterized by the fact that the size of either the above-mentioned cathode or anode electrode is increased in size so that it is not smaller than the thickness of the above-mentioned single cell.

3. Detailed description of the invention

[Field of industrial application]

The present invention pertains to a fuel cell used in the energy conversion field where the chemical energy of fuel is directly converted to electrical energy, and the invention further pertains to a laminated fuel cell where many fuel cell layers are laminated.

[Prior art]

In a conventional fuel cells, in particular, in a molten carbonate type fuel cell, each cell

has a structure where an electrolyte plate made of a porous material impregnated with a molten carbonate (tile) 1 is sandwiched between a cathode (oxygen electrode) 2 and anode (fuel electrode) 3, and an oxidizing gas OG is supplied to the cathode 2 side, and a fuel gas FG is supplied to the anode 3 side and power generation is achieved based on the potential difference generated between cathode 2 and anode 3 and the cells are stacked via separator 4 and laminated, and a specific fastening force is applied in the vertical direction to the stack.

In the molten carbonate type fuel cell having the above-mentioned structure, burning occurs when the oxidizing gas OG and fuel gas FG supplied to each cell are mixed, thus, in order to prevent burning, the gas leak is prevented with a electrolyte plate 1.

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[Problems to be solved by the invention]

However, the strength of the electrolyte plate is not adequate and when a pressure difference occurs between the cathode and anode, cracking is likely to occur due to the above-mentioned pressure difference. Especially when a difference in gas pressure applied to the cathode side and anode side exists and the length and the width of the cathode and anode are the same and the end members of the two electrodes that sandwich the electrolyte plate overlap, cracks 5 are formed in the electrolyte plate in the ends of the two electrodes 2 and 3 as shown in Fig. 3. When cracking occurs in the electrolyte plate, cross-leakage of gases occurs from the cathode side and anode side.

Based on the above-mentioned background, the present invention is to produce a laminated fuel cell where cracking is less likely to occur at the edges of the electrolyte plate.

[Means to solve the problem]

The present invention is a laminated fuel cell characterized by the fact that the size of either electrode of the above-mentioned cathode or anode is increased in size so that it is not smaller than the thickness of the above-mentioned single cell in a laminated fuel cell where many layers of cells where both surfaces of the electrolyte plate are sandwiched between a cathode and an anode are formed, and an oxidized gas is supplied to the cathode side, and a fuel gas is supplied to the anode side and the cells are laminated via separator.

[Effect of the invention]

When the size of either the cathode or anode is increased to a size greater than the thickness of a cell in comparison to the size of the other, cracking of the electrolyte plate based on the intensity of the electrode can be prevented even when a difference in pressure exists between the cathode side and anode side.

[Application Examples]

In the following, the present invention is explained in detail with reference to the drawings.

Fig. 1 shows an application example of the present invention, and in a fuel cell having a structure where a cell consisting of electrolyte plate 1 is sandwiched with cathode 2 and anode 3 on both sides is laminated via separator 4, the size of the anode is increased to a size greater than the size of the cathode, each end member of the anode and cathode is arranged so that overlapping does not occur, and a step where the end member of the anode is to be placed is formed on the anode side of the separator.

The size of the above-mentioned anode 3 is greater than the size of cathode 2 in the margin area by W, and said dimension is such that it is not less than the thickness T of the above-

mentioned single cell consisting of electrode plate 1, cathode 2 and anode 3, for example, $W \geq 2$ mm.

When the above-mentioned W is small, the cathode and anode ends are closer to one another and cracking is likely to occur.

As described above, when the size of the anode is increased compared to the cathode, for example, by $W \geq 2$ mm, overlapping of the margin area of the cathode and anode does not occur at the edges of the electrode plates, and the anode comes in contact with a wide area of the electrolyte, furthermore, the electrode plate near the margin area of the anode is sandwiched between the separators, thus, cracking of the electrode plate in the margin area of the anode due to a difference in pressure generated between the cathode side and anode size can be prevented.

It should be noted that the present invention is not limited to the above-mentioned application example, and in this case, the size of the anode is increased, but size of the cathode is increased as well.

[Effect of the invention]

As described above, according to the laminated fuel cell of the present invention; having the above-mentioned structure wherein the size of either of the above-mentioned cathode or anode electrodes is increased to a size such that it is not less than the thickness of the above-mentioned single cell, the end members of the cathode and anode do not match in the margin area, and a gap exists of a specific size; thus, cracking due to intensity of the electrode based on a difference in pressure generated between the cathode side and anode side can be prevented, and a long-lasting fuel cell battery can be produced.

4. Brief description of the figures

Fig. 1 is a cross-section that shows an application example of the laminated fuel cell of the present invention; Fig. 2 is a cross-section that shows an application example of a conventional laminated fuel cell; and Fig. 3 is a cross-section that shows cracking of the electrode plate of a conventional fuel cell.

[Explanation of codes]

1 ... Electrode plate, 2 ... Cathode, 3 ... Anode, 4 ... Separator, 5 ... Crack, I ... Cell.

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Fig. 1

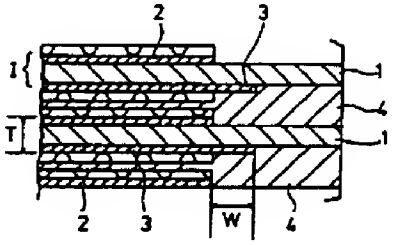

Fig. 2

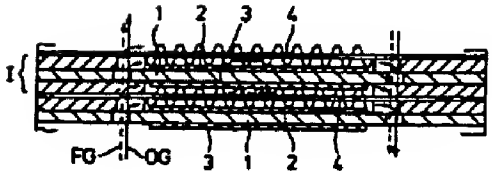

Fig. 3